S
330.978
638
M26pcm
1983

PLEASE RETURN

Phase Out of Coal Mining in the Decker Study Area: Bust Cycle Analysis

STATE DOCUMENTS COLLECTION

SEP 18 1984

MONTANA STATE LIBRARY
1515 E. 6th AVE.
HELENA, MONTANA 59620

MOUNTAIN WEST
RESEARCH - NORTH INC.

MONTANA STATE LIBRARY
S 330.976636 M26pcm 1983 c.1 MacFadyen
Phase out of coal mining in the Decker e
3 0864 00045977 9

Phase Out of Coal Mining in the Decker Study Area: Bust Cycle Analysis

by

Michael J. MacFadyen

Prepared for:

The Decker Area Mines Comprehensive Social Sciences Study
Montana Department of State Lands
U.S. Office of Surface Mining and Reclamation

Prepared by:

Mountain West Research-North, Inc.
Billings, Montana

May 1983

TABLE OF CONTENTS

Page

1. Introduction 1

2. Population and Economic Effects of a Temporary Decrease in Operations Employment 1

3. Population and Economic Effects of the Closure of an Operating Mine. 6

4. Population and Economic Effects of Mining Cessation. 13

5. Summary and Socioeconomic Consequences 13

1. INTRODUCTION

This appendix discusses the socioeconomic consequences of several alternative bust cycle scenarios in the Decker study area. During the course of the 1980-2015 forecast period, at least three types of bust cycles could occur. By increasing level of severity, these cycles could occur in the form of --

1) A temporary decrease in operations employment at an existing mine or mines,

2) Closure of an existing mine, and

3) Closure of all existing mines.

The most likely reason for any of the above types of bust cycles would be a decrease in national coal demand, which could be caused by changes in energy prices, environmental regulations, international relations, or other factors that cannot be predicted with certainty. During the forecast period, it is not likely that the proposed mines, or even additional mines, could exhaust the supply of coal in the Decker Area. Under the cumulative scenario, the Absaloka, Decker, Spring Creek, KME, Consol, Youngs Creek, and Tanner Creek mines are forecast to produce an average of 31 million tons per year (mmtpy) over the forecast period. If this production level were to continue indefinitely, the more than 6 billion tons of coal in the Decker area would last well beyond the twenty-first century.[1]

This appendix describes each of the three types of bust cycles in terms of the regional Decker project forecasts. However, because of the residential concentration of Decker area mine workers in Sheridan County, it can be inferred that most of the economic and population effects caused by the bust cycle would occur there. Section 2 focuses on the 1980-1985 baseline forecast in which the existing Absaloka, Spring Creek, and Decker mines are forecast to experience a temporary decrease in operations employment. Section 3 focuses on the population and economic effects of the projected closure of the proposed KME Mine in 2006. This discussion is relative to the KME site-specific assessment discussed in chapters 5, 6, and 7 of the Decker Area Mines Comprehensive Social Science Study report. Section 4 describes the effects of a "total bust" that could occur if all of the Decker area mines were to cease operations in 2003. Finally, Section 5 portrays the consequences of the population and economic effects described in sections 2, 3, and 4.

2. POPULATION AND ECONOMIC EFFECTS OF A TEMPORARY DECREASE IN OPERATIONS EMPLOYMENT

As shown in Table 2-1, employment at the Spring Creek, Absaloka, and Decker mines is estimated to have decreased from 965 workers in 1981 to 818 workers in 1982 and 701 workers in 1983. These employment reductions can be attributed to cutbacks in the mines' operating levels to below capacity because of depressed conditions in the national coal market. Assuming that conditions in the coal market improve, employment at the three mines is forecast to increase to 833 workers in 1984, 916 workers in 1985, and 983 workers in 1986 through 2000.

Tables 2-1 through 2-4 present the baseline population, employment, and income forecasts which include the above changes in mining employment. According to the forecasts shown in Table 2-1, total mining employment in the Decker study region declines from 1,385 workers in 1981 to 1,119 workers in 1983 and then increases to 1,462 workers by 1986. While the employment decline in the primarily basic mining sector

---

[1] Montana College of Mineral Science and Technology, Quality and Reserves of Strippable Coal, Selected Deposits, Southeastern Montana, Butte, Montana, 1974.

TABLE 2-1

Operations Employment at Baseline Mines

Year	Spring Creek Mine	Absaloka Mine	Decker Mine	TOTAL
1980	132	186	631	949
1981	228	164	573	965
1982	171	132	515	818
1983	117	125	459	701
1984	162	120	551	833
1985	208	120	588	916
1986	253	120	610	983

Source: Mountain West Research-North, Inc., 1983.

TABLE 2-2

Baseline Scenario Forecast
Total Employment by Sector
Study Region

Year	Ag Proprietors	Ag Labor	Mining	Construction	Manufacturing	TCPU	Trade	FIRE	Services	Government	Other +com.	Total
1980	1017	861	1390	1837	572	628	3479	631	3363	3460	179	17418
1981	1017	861	1385	1593	567	635	3464	625	3374	3421	179	17125
1982	1017	861	1228	1582	566	662	3461	621	3381	3397	179	16959
1983	1017	861	1119	1563	567	672	3475	619	3402	3390	179	16867
1984	1017	861	1257	1540	585	726	3564	627	3470	3470	179	17300
1985	1017	861	1394	1528	601	745	3651	635	3547	3550	179	17711
1986	1015	861	1462	1530	614	772	3725	641	3611	3615	179	18028
1987	1014	861	1518	1542	625	782	3796	648	3697	3685	179	18351
1988	1012	861	1578	1550	635	792	3865	654	3772	3747	179	18649
1989	1011	861	1603	1555	644	800	3919	658	3842	3801	179	18875
1990	1009	861	1660	1566	655	810	3994	665	3929	3868	179	19198
1991	1008	861	1659	1570	661	805	4041	668	3999	3913	179	19367
1992	1006	861	1690	1579	670	813	4108	673	4084	3974	179	19641
1993	1005	861	1687	1583	678	820	4159	676	4156	4018	179	19824
1994	1003	861	1660	1586	684	825	4210	679	4229	4059	179	19977
1995	1002	861	1678	1596	694	834	4278	684	4322	4124	179	20255
2000	993	861	1613	1621	733	834	4583	701	4749	4393	179	21263
2005	983	861	1154	1592	760	856	4812	702	5055	4606	179	21657
2010	971	860	1055	1674	800	893	5274	741	5758	5010	179	23237
2015	963	860	495	1681	819	908	5527	764	6180	5212	179	23593

Source: Mountain West Research-North, Inc., 1982.

TABLE 2-3

Baseline Scenario Forecast
Employment by Type
Study Region

Year	Total	Non Basic	Basic Total	Basic Non Project	Indirect Basic	Basic Project O&M	Project Construction-Perm	Project Construction-NLoc.
1980	17418	9412	8005	6315	51	1242	127	268
1981	17125	9272	7852	6494	53	1237	55	12
1982	16959	9153	7806	6607	55	1081	62	0
1983	16867	9088	7778	6688	58	973	57	0
1984	17300	9284	8015	6800	71	1111	32	0
1985	17711	9487	8224	6891	78	1248	6	0
1986	18028	9604	8424	7014	90	1315	3	0
1987	18351	9757	8593	7129	90	1370	3	0
1988	18649	9882	8767	7244	90	1428	3	0
1989	18875	9968	8907	7362	89	1452	3	0
1990	19198	10111	9087	7486	91	1506	3	0
1991	19367	10171	9195	7601	86	1504	3	0
1992	19641	10287	9354	7731	85	1533	3	0
1993	19824	10341	9482	7863	86	1529	3	0
1994	19977	10385	9592	8001	86	1500	3	0
1995	20255	10506	9748	8141	85	1517	3	0
2000	21263	10869	10393	8874	72	1443	3	0
2005	21657	10920	10736	9741	24	969	3	0
2010	23237	11660	11577	10697	16	861	3	0
2015	23593	11795	11798	11494	0	301	3	0

Source: Mountain West Research-North, Inc., 1982.

TABLE 2-4

Baseline Scenario Forecast
Population Change
Study Region

Year	Total Population	Births	Deaths	Employment-Related Migration	Non-employment Related Migration	Total Change
1980	37220	0	0	0	0	0
1981	38523	728	331	1028	-122	1303
1982	38780	750	337	-11	-143	257
1983	39005	743	337	-35	-145	225
1984	39223	719	337	-19	-143	218
1985	39942	706	334	482	-135	719
1986	40606	696	337	436	-131	664
1987	41043	693	341	220	-134	437
1988	41448	681	347	209	-138	404
1989	41788	671	351	160	-140	340
1990	42355	650	353	410	-140	567
1991	42517	641	357	20	-141	163
1992	42931	633	358	272	-134	413
1993	43180	636	360	110	-137	249
1994	43335	628	366	33	-140	155
1995	43694	623	368	247	-143	359
2000	44671	632	388	210	-151	302
2005	45190	643	393	356	-144	470
2010	48261	677	434			
2015	49350	711	447			

Source: Mountain West Research-North, Inc., 1982.

would not have a very large effect on any particular economic sector, it is forecast to cause total nonbasic employment in the region to decline from 9,412 workers in 1980 to 9,088 workers in 1983. After 1983, when mining employment is forecast to meet and then surpass the 1980 level, nonbasic employment is forecast to rise to 9,604 workers by 1986 and over 10,000 workers by 1990.

Table 2-4 presents the baseline population forecasts. As shown, population growth is forecast to occur between 1980 and 1983, despite the decrease in mining employment. Generally, one would expect a decline in the population commensurate with the rate of decline in employment due to the out-migration of workers and their families seeking new employment opportunities. However, neither actual school enrollments nor automobile registrations in Sheridan County dropped below 1981 levels in 1982, despite a significant decline in coal mine employment that year. This is probably due to the poor economic conditions nationwide and the lack of adequate employment opportunities outside the study region for laid-off workers. Consequently, the local workers and their families apparently have chosen to remain in the area and wait for economic conditions to improve rather than out-migrating.

As shown in Table 2-5, total labor income under baseline conditions is forecast to decline from $245 million in 1980 to $229 million in 1983 and then increase to $250 million in 1986. Over the same period, per capita income is forecast to decline from $9,600 in 1980 to $8,708 in 1983 and then increase to $8,956 in 1986.

3. POPULATION AND ECONOMIC EFFECTS OF THE CLOSURE OF AN OPERATING MINE

As shown in Table 3-1, operations employment at the KME Mine is forecast to decline from a peak of 265 persons in 2003 to 157 persons in 2006 and then to zero after the mine has closed in 2007. As shown in Table 3-2, the closure of the KME Mine would cause total mining employment in the study region to decline from 1,887 workers in 2003 to 1,628 workers in 2007 when most of the region's mining employment would be at the Absaloka, Spring Creek and other smaller coal and gravel mining operations. In addition, the mine closure would cause railroad employment to decrease by 16 workers between 2003 and 2007. Although TCPU employment would show a slight decline between 2003 and 2007, all other sectors except agricultural proprietors are forecast to exhibit moderate growth over this period. Similarly, as shown in Table 3-3, the closure of the KME Mine would decrease basic project operations and maintenance employment, but would not have a very noticeable effect on nonbasic employment, which is forecast to continue to grow by about 0.5 percent per year over the four-year period.

The KME Mine closure would have a very slight effect on the trends in area population during the 2000-2010 period. As shown in Table 3-4, total population in the two-county region is forecast to grow from 46,266 people in 2001 to 47,663 people in 2004, an increase of 3.0 percent over the three-year period prior to mine closure. As mining employment winds down between 2004 and 2007, however, total population is forecast to grow more slowly, reaching 48,504 people by 2007, an increase of only 1.8 percent over the three-year period. After 2007, the total population is forecast to grow by 3.5 percent in two years to 50,141 people and then stabilize for the remainder of the forecast period. This stabilization reflects the assumption that the regional economy will not receive any new economic stimulus between 2009 and 2010. If some stimulus did occur, however, then employment, population, and income would continue to grow.

As shown in Table 3-5, total labor income under the KME Scenario is forecast to increase from $308 million in 2000 to $321 million in 2004, remain at about $321 million through 2007, and then increase to $330 million in 2009. The effect of a loss in high-paying mining jobs is also evident in the per capita income forecasts. As shown, per capita income is forecast to decline from $9,458 in 2003 to $9,403 in 2007 and then increase to $9,585 in 2010.

TABLE 2-5

Baseline Scenario Forecast
Personal Income
Study Region
(1980 $ 000)

Year	Total Labor Income	FICA Payments Payments	Non-labor Income	Residency Adjustment	Total Personal Income	Personal Income Per Capita
1980	245959	13248	124585	7	357303	9600
1981	239400	12972	123463	7	349898	0
1982	233372	12626	122731	7	343485	0
1983	229537	12435	122560	7	339669	8708
1984	237741	12797	124016	7	348968	0
1985	246404	13230	125545	7	358726	0
1986	250531	13391	126523	7	363670	8956
1987	256565	13756	127888	7	370704	0
1988	260919	14018	128839	7	375746	0
1989	264191	14189	129370	7	379380	0
1990	269623	14532	130459	7	385557	9103
1991	271511	14642	130879	7	387756	0
1992	276124	14946	131442	7	392628	0
1993	278220	15062	131422	7	394587	0
1994	279571	15151	131527	7	395955	0
1995	284435	15442	132396	7	401396	0
2000	294718	16041	136173	7	414857	9287
2005	297916	16340	145340	7	426914	0
2010	318123	17474	159588	7	460257	9537
2015	323467	17918	171463	7	477012	0

Source: Mountain West Research-North, Inc., 1982.

TABLE 3-1

KME Mine Operations Employment

Year	Employment
2002	265
2003	265
2004	248
2005	195
2006	157
2007	0

Source: Mountain West Research-North, Inc., 1983.

TABLE 3-2

KME Scenario Forecast
Total Employment by Sector
Study Region

Year	Ag Proprietors	Ag Labor	Mining	Construction	Manufacturing	TCPU	Trade	FIRE	Services	Government	Other +com.	Total
1980	1017	861	1390	1837	572	628	3479	631	3363	3460	179	17418
1981	1017	861	1385	1593	567	635	3464	625	3374	3421	179	17125
1982	1017	861	1228	1582	566	662	3461	621	3381	3397	179	16959
1983	1017	861	1119	1563	567	672	3475	619	3402	3390	179	16867
1984	1017	861	1257	1540	585	726	3564	627	3470	3470	179	17300
1985	1017	861	1394	1656	608	753	3689	640	3568	3589	179	17956
1986	1015	861	1462	1843	630	789	3813	653	3663	3708	179	18620
1987	1014	861	1753	1629	644	819	3888	661	3758	3793	179	19001
1988	1012	861	1843	1568	654	836	3953	666	3830	3848	179	19252
1989	1011	861	1868	1574	662	843	4007	670	3899	3902	179	19479
1990	1009	861	1925	1585	673	854	4082	677	3987	3970	179	19804
1991	1008	861	1924	1589	680	848	4130	680	4057	4016	179	19974
1992	1006	861	1955	1598	689	857	4197	685	4142	4077	179	20249
1993	1005	861	1952	1602	696	863	4249	688	4215	4121	179	20436
1994	1003	861	1925	1605	703	869	4300	691	4288	4163	179	20591
1995	1002	861	1943	1615	713	878	4370	696	4382	4230	179	20871
1996	1000	861	1943	1620	722	885	4431	699	4464	4283	179	21090
1997	999	861	1909	1625	729	890	4490	702	4545	4331	179	21263
1998	997	861	1887	1628	732	861	4531	705	4623	4374	179	21380
1999	995	861	1887	1634	742	870	4605	709	4717	4440	179	21643
2000	993	861	1878	1641	752	879	4678	713	4811	4502	179	21890
2001	991	861	1889	1649	764	892	4758	720	4912	4576	179	22194
2002	989	861	1891	1654	774	898	4836	725	5015	4648	179	22476
2003	987	861	1887	1666	786	913	4925	731	5123	4725	179	22785
2004	985	861	1871	1672	797	900	5005	735	5228	4796	179	23032
2005	983	861	1379	1607	772	871	6876	711	5100	5689	179	22096
2006	981	861	1784	1684	804	900	5120	743	5434	4921	179	23414
2007	979	861	1628	1685	810	902	5180	745	5529	4963	179	23465
2008	977	861	1630	1697	824	916	5287	753	5659	5061	179	23847
2009	975	861	1632	1710	839	930	5396	760	5792	5162	179	24240
2010	971	860	1055	1676	802	895	5286	742	5766	5025	179	23282
2015	963	860	495	1683	821	910	5539	765	6188	5227	179	23638

Source: Mountain West Research-North, Inc., 1982.

TABLE 3-3

KME Scenario Forecast
Employment by Type
Study Region

Year	Total	Non Basic	Basic Total	Basic Non Project	Indirect Basic	Basic Project O&M	Project Construc-tion-Perm	Project Construc-tion-NLoc.
1980	17418	9412	8005	6315	51	1242	127	268
1981	17125	9272	7852	6494	53	1237	55	12
1982	16959	9153	7806	6607	55	1081	62	0
1983	16867	9088	7778	6688	58	973	57	0
1984	17300	9284	8015	6800	71	1111	32	0
1985	17956	9603	8352	6891	88	1248	69	55
1986	18620	9889	8731	7014	106	1315	160	135
1987	19001	10081	8920	7146	98	1605	39	31
1988	19252	10183	9068	7269	102	1693	3	0
1989	19479	10271	9208	7387	100	1717	3	0
1990	19804	10415	9388	7511	102	1771	3	0
1991	19974	10477	9497	7626	97	1769	3	0
1992	20249	10593	9655	7756	97	1798	3	0
1993	20436	10651	9784	7888	97	1794	3	0
1994	20591	10697	9893	8026	98	1765	3	0
1995	20871	10821	10049	8166	97	1782	3	0
1996	21090	10897	10193	8311	98	1780	3	0
1997	21263	10954	10308	8463	98	1744	3	0
1998	21380	10995	10385	8579	80	1721	3	0
1999	21643	11101	10542	8736	82	1719	34	0
2000	21890	11196	10694	8899	83	1708	3	0
2001	22194	11320	10874	9067	84	1718	3	0
2002	22465	11435	11040	9235	82	1718	3	0
2003	22785	11567	11217	9416	85	1712	3	0
2004	23032	11676	11355	9571	84	1695	3	0
2005	22096	11164	10931	9741	24	1164	3	0
2006	23414	11839	11574	9933	33	1604	3	0
2007	23465	11852	11613	10129	33	1447	3	0
2008	23847	12029	11817	10333	33	1447	3	0
2009	24240	12218	12022	10538	33	1447	3	0
2010	23282	11705	11377	10697	16	861	3	0
2015	23638	11840	11798	11494	0	301	3	0

Source: Mountain West Research-North, Inc., 1982.

TABLE 3-4

KME Scenario Forecast
Population Change
Study Region

Year	Total Population	Births	Deaths	Employment-Related Migration	Non-employment Related Migration	Total Change
1980	37220	0	0	0	0	0
1981	38523	728	331	1028	-122	1303
1982	38780	750	337	-11	-143	257
1983	39005	743	337	-35	-145	225
1984	39223	719	337	-19	-143	218
1985	40384	706	334	925	-135	1161
1986	41609	703	337	991	-132	1224
1987	42346	708	342	508	-136	737
1988	42633	706	350	72	-141	287
1989	42994	692	354	164	-142	360
1990	43562	671	356	396	-143	568
1991	43723	661	361	5	-143	161
1992	44131	652	361	254	-136	408
1993	44380	654	363	99	-140	249
1994	44544	645	370	33	-142	164
1995	44885	639	372	220	-146	341
1996	45104	642	374	100	-149	219
1997	45244	635	378	32	-149	140
1998	45357	640	381	16	-152	123
1999	45539	645	387	68	-153	172
2000	45837	645	394	201	-154	298
2001	46266	647	394	329	-153	429
2002	46712	655	399	342	-152	445
2003	47226	665	407	407	-150	514
2004	47663	674	410	322	-149	437
2005	45961	655	399	120	-147	235
2006	48361	681	427	354	-145	462
2007	48504	686	432	33	-143	143
2008	49275	680	438	671	-141	771
2009	50141	691	451	767	-140	866
2010	48261	677	434			
2015	49350	711	447			

Source: Mountain West Research-North, Inc., 1982.

TABLE 3-5

KME Scenario Forecast
Personal Income
Study Region
(1980 $ 000)

Year	Total Labor Income	FICA Payments Payments	Non-labor Income	Residency Adjustment	Total Personal Income	Personal Income Per Capita
1980	245959	13248	124585	7	357303	9600
1981	239400	12972	123463	7	349898	0
1982	233372	12626	122731	7	343485	0
1983	229537	12435	122560	7	339669	0
1984	237741	12797	124016	7	348968	0
1985	251541	13497	126329	7	364380	0
1986	263022	14042	128466	7	377453	0
1987	271064	14477	130289	7	386883	0
1988	274388	14679	131203	7	390919	0
1989	277672	14849	131789	7	394619	0
1990	283125	15194	132941	7	400880	9203
1991	285034	15304	133427	7	403163	0
1992	289623	15608	134055	7	408077	0
1993	291793	15728	134124	7	410197	0
1994	293175	15818	134320	7	411685	0
1995	298072	16110	135280	7	417249	0
1996	300647	16251	135786	7	420190	0
1997	301974	16339	136477	7	422119	0
1998	302601	16393	136918	7	423133	0
1999	305745	16563	138314	7	427503	0
2000	308498	16716	139489	7	431279	9409
2001	312410	16924	140986	7	436478	0
2002	315806	17109	142512	7	441216	0
2003	319459	17309	144547	7	446704	9458
2004	321869	17445	146639	7	451070	0
2005	307632	16817	148385	7	439202	0
2006	324303	17612	150067	7	456765	0
2007	321446	17492	152128	7	456089	9403
2008	326071	17742	155355	7	463691	0
2009	330852	1799	158949	7	471809	0
2010	318705	17501	161333	7	462558	9585
2015	324049	17945	173265	7	479370	0

Source: Mountain West Research-North, Inc., 1982.

4. POPULATION AND ECONOMIC EFFECTS OF MINING CESSATION

In the Decker study "bust scenario," total operations employment at the Decker area mines (KME, Consol Level 2, Youngs Creek, Tanner Creek) is forecast to grow from 2,894 workers in 2000 to 2,987 workers in 2002 and then decrease to zero in 2003, when it is assumed that all of the above mines are closed (see Table 4-1). When interpreting the population effects of these closures, it is important to note that even if the market for coal were to completely collapse, the mines would be more likely to close over a period of years rather than all at one time, as assumed in the bust cycle. In addition, even if all of the mines were to close simultaneously, population out-migration might occur over a period of years, rather than instantaneously as assumed in the bust cycle. However, the bust cycle presented here does allow several pre- and post-bust comparisons to be made.

As shown in Table 4-2, total employment in the two-county region under the bust cycle would decline from 26,809 workers in 2002 to 18,849 workers in 2003, a level that would be similar to total employment in the mid-1980s when the Big Horn, Decker, Spring Creek, and Absaloka mines were in production, but before the KME, Consol, Youngs Creek and Tanner Creek mines would have begun operations. This decline implies that the direct, indirect, and induced employment attributable to the eight mines in the cumulative scenario would have been responsible for 30 percent of total regional employment before the bust in 2002. After the bust occurred in 2003, total employment would begin to rise, increasing, from 18,849 workers in 2003 to 20,872 workers in 2009. As shown in Table 4-3, the 30 percent decrease in basic employment would also trigger a 30 percent decrease in nonbasic employment between 2002 and 2003.

Table 4-4 presents the bust cycle population forecasts. As shown, the loss of 7,960 jobs caused by the bust in 2003 is forecast to trigger an out-migration of 13,423 people from the area. Of course, the magnitude of this out-migration would depend on a number of factors, such as the national economy and the degree to which mine workers might retire early instead of leaving. More detail on these factors is provided in Section 5. However, under the bust forecast, the regional population is forecast to decline from 53,770 people in 2002 to 40,509 people in 2003, a decrease of 25 percent. The 2003 population would be similar to the mid-1980s level, and would begin growing again during the first decade of the twenty-first century, but at a much slower rate than exhibited at the height of cumulative scenario coal development in the 1980s and 1990s.

As shown in Table 4-5, total labor income under the bust scenario would decline from $422 million in 2002 to $233 million in 2003, a decrease of 45 percent. This large decrease in income is also reflected in the per capita income forecasts, which project a decline from $10,482 in 2002 to $8,799 in 2003. The drop in per capita income reflects the fact that the loss in high-paying mining jobs in consequent local expenditures would cause income to decrease by a larger percentage than either employment or population in the last year.

5. SUMMARY AND SOCIOECONOMIC CONSEQUENCES

As described in Section 2, the temporary layoff of approximately 260 mine workers in Decker area mines between 1980 and 1983 is expected to cause a decline in nonbasic employment and total and per capita personal income, but to have a lesser effect on the area's population. Presumably, mine workers that have been temporarily laid off have chosen to remain in the area and wait for conditions to improve rather than to pursue employment elsewhere in a nationally depressed economy.

As described in Section 3, the gradual closure of the KME Mine between 2003 and 2007 would result in the permanent layoff of about 265 mine workers. This layoff would decrease the rates at which local employment, population, and income are forecast to be growing, and would temporarily reduce per capita personal incomes. However, the overall economic and population growth expected during the first decade of

TABLE 4-1

Cumulative Scenario Operations Employment with Bust in 2003 Absaloka, Decker, Spring Creek, KME, Consol Level 2, Youngs Creek, and Tanner Creek Mines

Year	Employment
2000	2,894
2001	2,954
2002	2,987
2003	0
2004	0

Source: Mountain West Research-North, Inc., 1983.

TABLE 4-2

Bust Scenario Forecast
Total Employment by Sector
Study Region

Year	Ag Proprietors	Ag Labor	Mining	Construction	Manufacturing	TCPU	Trade	FIRE	Services	Government	Other +com.	Total
1980	1017	861	1390	1837	572	628	3479	631	3363	3460	179	17418
1981	1017	861	1385	1593	567	635	3464	625	3374	3421	179	17125
1982	1017	861	1228	1582	566	662	3461	621	3381	3397	179	16959
1983	1017	861	1119	1563	567	672	3475	619	3402	3390	179	16867
1984	1017	861	1257	1540	585	726	3564	627	3470	3470	179	17300
1985	1017	861	1394	1664	608	753	3690	640	3570	3591	179	17970
1986	1015	861	1660	2047	650	810	3916	666	3738	3825	179	19371
1987	1014	861	2201	2121	692	893	4126	692	3939	4066	179	20788
1988	1012	861	2581	1979	713	935	4230	702	4090	4178	179	21464
1989	1011	861	2747	1682	726	984	4296	706	4162	4235	179	21593
1990	1009	861	2829	1677	743	1023	4393	715	4280	4325	179	22038
1991	1008	861	2828	1683	750	1044	4447	719	4354	4378	179	22253
1992	1006	861	2859	1692	760	1053	4515	724	4440	4441	179	22534
1993	1005	861	2856	1697	768	1060	4569	727	4514	4488	179	22727
1994	1003	861	2829	1700	775	1066	4622	731	4588	4532	179	22889
1995	1002	861	2847	1711	785	1075	4693	736	4683	4601	179	23176
1996	1000	861	2850	1880	804	1106	4799	744	4804	4695	179	23725
1997	999	861	3016	2188	841	1164	4997	763	5031	4899	179	24941
1998	997	861	3262	2013	857	1180	5099	774	5152	5020	179	25398
1999	995	861	3415	1805	872	1242	5183	779	5258	5095	179	25689
2000	993	861	3416	1816	885	1261	5267	785	5365	5170	179	26002
2001	991	861	3477	1830	901	1287	5366	793	5483	5264	179	26434
2002	989	861	3512	1841	914	1303	5458	800	5597	5351	179	26809
2003	987	861	192	1550	675	478	4369	657	4773	4125	179	18849
2004	985	861	193	1556	684	463	4444	661	4876	4189	179	19093
2005	983	861	195	1565	696	474	4534	666	4988	4270	179	19415
2006	981	861	197	1574	708	486	4625	672	5105	4351	179	19742
2007	979	861	198	1585	722	498	4725	680	5230	4444	179	20105
2008	977	861	200	1597	736	512	4832	688	5358	4541	179	20484
2009	975	861	202	1609	751	525	4939	695	5491	4641	179	20872

For Review Only

Source: Mountain West Research - Southwest, Inc.,12/10/82

TABLE 4-3

Bust Scenario Forecast
Employment by Type
Study Region

Year	Total	Non Basic	Basic Total	Basic Non Project	Indirect Basic	Basic Project O&M	Project Construction-Perm	Project Construction-NLoc.
1980	17418	9412	8005	6315	51	1242	127	268
1981	17125	9272	7852	6494	53	1237	55	12
1982	16959	9153	7806	6607	55	1081	62	0
1983	16867	9088	7778	6688	58	973	57	0
1984	17300	9284	8015	6800	71	1111	32	0
1985	17970	9610	8360	6891	88	1248	73	58
1986	19371	10249	9122	7014	122	1513	246	225
1987	20788	10928	9859	7171	136	2053	266	232
1988	21464	11253	10210	7310	140	2431	219	109
1989	21593	11348	10245	7469	150	2596	20	8
1990	22038	11577	10460	7618	163	2675	3	0
1991	22253	11659	10593	7758	158	2673	3	0
1992	22534	11782	10752	7888	158	2702	3	0
1993	22727	11846	10881	8020	158	2698	3	0
1994	22889	11898	10990	8158	159	2669	3	0
1995	23176	12029	11146	8298	157	2686	3	0
1996	23725	12245	11479	8460	178	2687	103	50
1997	24941	12834	12107	8636	214	2851	235	168
1998	25398	13104	12293	8785	194	3096	87	129
1999	25689	13243	12445	8993	200	3247	3	0
2000	26002	13383	12619	9164	205	3246	3	0
2001	26434	13572	12861	9341	209	3306	3	0
2002	26809	13736	13072	9517	212	3339	3	0
2003	18849	9734	9114	9093	0	17	3	0
2004	19093	9823	9269	9248	0	17	3	0
2005	19415	9960	9455	9434	0	17	3	0
2006	19742	10094	9647	9626	0	17	3	0
2007	20105	10262	9843	9822	0	17	3	0
2008	20484	10436	10048	10026	0	17	3	0
2009	20872	10620	10252	10231	0	17	3	0

For Review Only

Source: Mountain West Research - Southwest, Inc.,12/10/82

TABLE 4-4

Bust Scenario Forecast
Population Change
Study Region

Year	Total Population	Births	Deaths	Employment-Related Migration	Non-employment Related Migration	Total Change
1980	37220	0	0	0	0	0
1981	38523	728	331	1028	-122	1303
1982	38780	750	337	-11	-143	257
1983	39005	743	337	-35	-145	225
1984	39223	719	337	-19	-143	218
1985	40403	706	334	943	-135	1180
1986	43073	703	337	2437	-132	2670
1987	45594	735	345	2270	-139	2521
1988	46219	765	356	363	-147	625
1989	46636	760	361	168	-150	417
1990	47334	741	365	473	-151	698
1991	47574	729	370	31	-151	239
1992	47981	718	371	205	-144	408
1993	48227	716	374	51	-148	245
1994	48429	703	381	32	-151	202
1995	48713	695	384	128	-155	284
1996	49370	694	387	508	-158	656
1997	51105	692	392	1594	-159	1735
1998	51873	725	399	608	-166	768
1999	52275	742	407	236	-169	401
2000	52578	749	417	142	-171	303
2001	53204	747	419	468	-169	626
2002	53770	756	426	404	-168	566
2003	40509	765	435	-13423	-167	-13260
2004	40414	447	410	2	-132	-94
2005	40545	452	421	233	-134	130
2006	40977	463	426	529	-133	432
2007	41543	484	430	644	-132	566
2008	42337	506	437	856	-132	794
2009	43206	535	450	915	-131	869

For Review Only

Source: Mountain West Research - Southwest, Inc.,12/10/82

TABLE 4-5

Bust Scenario Forecast
Personal Income
Study Region
(1980 $000)

Year	Total Labor Income	FICA Payments Payments	Non-labor Income	Residency Adjustment	Total Personal Income	Personal Income Per Capita
1980	245959	13248	124585	7	357303	11125
1981	239400	12972	123463	7	349898	0
1982	233372	12626	122731	7	343485	0
1983	229537	12435	122560	7	339669	0
1984	237741	12797	124016	7	348968	0
1985	251863	13516	126380	7	364734	0
1986	279527	14907	131087	7	395715	0
1987	310003	16542	136646	7	430114	0
1988	324994	17539	139763	7	447226	0
1989	328474	17697	140617	7	451401	0
1990	338278	18339	142690	7	462636	10560
1991	340940	18484	143495	7	465958	0
1992	345616	18791	144339	7	471171	0
1993	347863	18915	144639	7	473595	0
1994	349329	19008	145088	7	475416	0
1995	354324	19306	146316	7	481342	0
1996	363496	19844	148127	7	491786	0
1997	390550	21490	153250	7	522317	0
1998	401221	22026	155728	7	534931	0
1999	405846	22278	157833	7	541408	0
2000	410521	22554	159734	7	547708	10417
2001	417199	22919	162040	7	556327	0
2002	422551	23212	164262	7	563609	10492
2003	233316	12875	135997	7	356445	8799
2004	235995	13026	136876	7	359852	0
2005	239891	13236	138875	7	365537	0
2006	243842	13454	140610	7	371006	0
2007	248240	13692	143618	7	378173	0
2008	252845	13940	146704	7	385617	0
2009	257563	14194	150122	7	393499	9108

For Review Only

Source: Mountain West Research - Southwest, Inc.,12/10/82

OK, SLIST T.BI.CO

the twenty-first century makes it very difficult to isolate the economic and demographic effects of the closing of one mine which accounts for only about 3 percent of the region's employment and population in 2000.

As described in Section 4, the immediate loss of about 3,000 mining jobs in 2003 would cause an additional loss of about 5,000 nonmining jobs and the out-migration of over 13,000 people if all who lost their jobs decided to leave the area. The loss of mining jobs would also have a devastating effect on the Crow Indian population, as about 587 mining jobs would be lost between 2002 and 2003 if the bust cycle occurred. Because the mining jobs would be more highly paid than most other jobs in the regional economy, the bust cycle would cause average per capita income to decline from about $10,500 to $8,800, a reduction of $1,700 per person.

When interpreting the above forecasts, and particularly those pertaining to population, it should be noted that in the event of mining layoffs or closures, out-migration would depend on a number of factors. First, the attractiveness of relocation would depend on the availability of job opportunities elsewhere, the transferability of mine workers' skills, and their willingness to be retrained or accept work in other occupations. Second, while many of the current mine workers in the Decker area are relative newcomers and may be perceived as extremely mobile, by 2000 the displaced mine workers are apt to be longtime residents of the area. Hence, they can be expected to have stronger family and community ties in the region and be less likely to pursue employment opportunities elsewhere. Both of these conditions imply that actual out-migration could be less than indicated in the forecast.

However, regardless of the actual level of out-migration caused by a bust cycle, mining layoffs and/or closures would undoubtedly affect the individuals who remain in the area and the communities in which they live. The next two sections portray some of the socioeconomic consequences of possible mine closures on individuals and communities.[1]

5.1 Individuals

The individual mine worker (or other worker in an indirect basic or nonbasic industry) that is displaced by a layoff or mine closure usually faces four alternative choices: unemployment, retraining for another job, relocation, or early retirement. In deciding which alternative to pursue (or accept) the workers and their families must consider a multitude of factors, which include: the marketability of the workers' skills; the availability of jobs in other industries and communities, the worker's age and health; the family's financial resources; the costs of leaving home, family and friends; and the potential benefits that may be available when a worker is eligible for early retirement. It should also be noted that displaced workers' and their families' perceptions of all of these factors may be influenced by the length of time they have been unemployed and their eligibility for unemployment benefits.

The ability of unemployed persons and their families to cope with adverse economic conditions would depend on personal characteristics and on financial reserves or supplemental resources. Research on plant closures has suggested that financial resources may be especially important, because they allow unemployed workers and their families to continue social reciprocity, maintain membership in meaningful associations, and exercise control over the environment. However, even when income maintenance programs are in effect, the incidence of mental health and other social problems can be expected to increase in areas where industrial plant or mine closures occur.

---

[1] Material for these sections is drawn largely from Gordis, Jeanne; Jarley, Paul; and Ferman, Louis, Plant Closings and Economic Dislocation (1981), W.E. Upjohn Institute for Employment Research, Kalamazoo, MI, 49007.

5.2 Communities

In the communities of Big Horn and Sheridan counties, one or more mine closures would adversely affect workers in mining supply industries and other businesses that depend on mining or mine worker expenditures. In addition, the jobs of teachers and other government workers who depend on population levels and the local tax base could be jeopardized when population out-migration begins.

However, as noted above, there are many forces which would cause displaced workers to remain in the local area rather than out-migrate. These workers and their families could pose problems at every level of local and even state government as they enroll in government programs that provide economic and social assistance and training. The seriousness of the problem would of course depend on local governments' previous experience with such closures, their financial resources and the availability of outside assistance, and their ability to quickly coordinate service provision after a mine closure takes place.

If the threat of a mine closure becomes imminent, communities in the Decker study area may want to consider a number of programs to -- (1) influence the timing of the closure so as to minimize impacts, (2) reemploy or retrain laid off workers, and (3) monitor the local economy in an effort to maintain its stability. The timing of the closure can be an especially important issue when lead time is required by agencies and groups that provide essential services to displaced workers.